

CLAIMS

1 1. A photon number state generating apparatus
2 comprising:

3 a photon pair source for generating a pair of photons
4 consisting of a signal photon and an idler photon which are corrected in
5 time of generation each other;

6 a photon number detector for detecting a number of the idler
7 photons;

8 a gate device for controlling an emission of the signal
9 photons;

10 a controller for controlling the gate device in response to a
11 photon number information from the photon number detector.

1 2. The photon number state generating apparatus of claim
2 1, wherein said photon pair source comprises:

3 a pumping light source;

4 a nonlinear optical medium on which a pumping light from
5 the pumping light source is incident.

1 3. The photon number state generating apparatus of claim
2 2 comprising:

3 a nonlinear optical crystal in which an angle between the
4 pumping light and an optical axis of the nonlinear optical medium is set
5 to an angle at which tuning curves come in contact with a straight line
6 corresponding to a single specific wavelength λ .

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1 4. The photon number state generating apparatus of claim
2 2 comprising:

3 a nonlinear optical crystal in which an angle between the
4 pumping light and an optical axis of the nonlinear optical medium is set
5 to an angle at which tuning curves come in contact with two straight
6 lines corresponding to two specific wavelength a and b.

1 5. The photon number state generating apparatus of claim
2 2, wherein said nonlinear optical medium on which the pumping light is
3 incident comprises a waveguide channel type nonlinear optical medium.

1 6. The photon number state generating apparatus of claim
2 2, wherein the nonlinear optical medium on which the pumping light is
3 incident comprises a pseudophase matching type nonlinear optical
4 medium.

1 7. The photon number state generating apparatus of claim
2 1 comprising:

3 a pulse height discriminator equipped in the controller for
4 discriminating a photon number information having photon number
5 within a specified range, wherein the controller controls the gate device
6 in response to the photon number information from the photon number
7 detector.

1 8. The photon number state generating apparatus of claim
2 1 comprising:

3 a photon number detector in which an output pulse height

4 changes in response to the number of incident photons;
5 a pulse height discriminator equipped in the controller for
6 discriminating output pulse of photon number detector having a pulse
7 height of a specified range.

1 9. The photon number state generating apparatus of claim
2 1 comprising:

3 a discriminator for discriminating a case in which a number
4 of photon incident on the photon number detector in one.

1 10. The photon number state generating apparatus of claim
2 1 comprising:

3 a pulse height discriminator for discriminating a case in
4 which an output pulse height of the photon number detector
5 corresponding to a number of incident photon that is one.

1 11. The photon number state generating apparatus of claim
2 7, wherein said controller comprises:

3 a clock generator;

4 a gate operation frequency judging section for controlling the
5 gate device to be opened or closed for less than a specified number of
6 times within a predetermined time defined by clock signal of the clock
7 generator.

1 12. The photon number state generating apparatus of claim
2 7, wherein said controller comprises:

3 a clock generator;

4 a gate operation frequency judging section for controlling the
5 gate to be opened or closed only for a first signal of the photon number
6 detector within a predetermined time defined by clock signal of the clock
7 generator.

1 13. The photon number state generating apparatus of claim
2 1, wherein said gate device for controlling an emission of the signal
3 photon comprises a plurality of shutters which open or close in a time
4 difference shorter than a open or close time of the shutters.

1 14. The photon number state generating apparatus of claim
2 1 further comprising:

3 an optical fiber for allowing the idler photon to reach the gate
4 device for controlling an emission of the photon.

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